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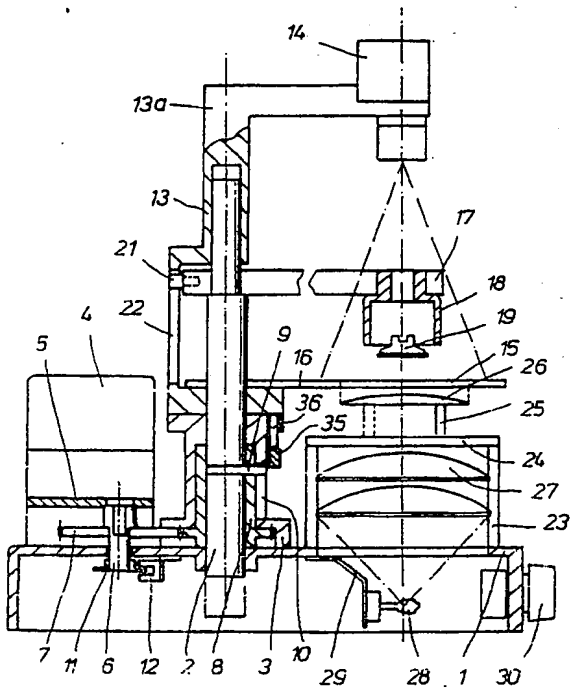
(54) Apparatus for centering and blocking ophtalmic lenses.

(57) The apparatus comprises a transparent screen (15) which picks up the image that an optical unit (27, 28) forms of the ophthalmic lens (26) to be centered and blocked. The screen image is picked up by a video camera (14) and transmitted to a monitor where it is superimposed on the already corrected image received by the monitor of the frame ring to which the lens (26) is to be mounted. An angular movement of the screen (15) and camera (14) is accompanied by an angular movement and by a downward movement of an intermediate arm (17) carrying a member (19) which is adhered to the ophthalmic lens (26).

FIG. 1



EP 0 409 760 A1

APPARATUS FOR CENTERING AND BLOCKING OPHTHALMIC LENSES

The invention relates to an apparatus for centering and blocking ophthalmic lenses for use in lens bevelling machines. The apparatus is provided with support means for the ophthalmic lens; means for adhering a member to said ophthalmic lens; a monitor receiving a digital image of the contour of the shape to be obtained by bevelling; and a video camera which is located vertically above the said ophthalmic lens, picks up images and transmits them to said monitor.

As is known, ophthalmic lenses are manufactured generally in the form of a concavo-convex spherical cap and the characteristics of their graduation involve differences in thickness and also in the curvature of the surfaces thereof. Herein the above mentioned lens is from time to time called ophthalmic lens blank.

Ophthalmic lenses have to be prepared for fitting to a specific frame, involving a modification of the perimeter thereof to adapt it to the frame. This operation is performed on the said lens bevelling machines which are provided with grindstones for abrading and final polishing of the said perimeter.

Between the geometric centres of the two rings of a frame, there is a set distance which usually differs from the wearer's interpupillary distance and there is also frequently a difference in height between said geometric centres and the wearer's pupil. These factors make corrections obliging decentering of the bevelled lens relative to the ophthalmic lens blank necessary.

Therefore, it becomes necessary to compare the perimeter of both lenses to ascertain whether the opthalmic lens blank is appropriate for obtaining the lens required for the frame.

It is already known to superimpose in a monitor, on the one hand, the image of the ophthalmic lens blank, picked up and transmitted by a video camera with, on the other hand, the digital image of the form to be bevelled obtained, as the case may be, by a contour reader or other appropriate device. Where the comparison by superimpositioning leads to a positive conclusion, the ophthalmic lens is then blocked by adhering it to a member allowing the lens to be held for the subsequent bevelling process.

Nevertheless, in the known embodiments, the video camera obtains an image of the ophthalmic lens directly therefrom, whereby errors are easily made due to the thickness of the lens.

Furthermore, in certain known embodiments, it is the ophthalmic lens blank which is moved, whereby the member to be adhered thereto for the bevelling process is applied in a position not coinciding with the lens optical centre. This offset blocking causes undesired variations in the lens position during the bevelling process.

To overcome the above limitations, an apparatus of the type described at the beginning has been devised, characterised fundamentally in that it comprises: a) an optical unit having at least one condensing lens and by a light-emitting source, said unit being situated at a lower level than said support means and defining an optical axis; and b) an at least partially transparent screen, adapted to be located with the centre thereof aligned with said optical axis, inserted between said video camera and said support means and capable of receiving an image, projected by said optical unit, of the ophthalmic lens situated on said support means; and in that the distance between the video camera and the transparent screen is constant.

Further advantages and features of the invention will be appreciated from the following description in which one preferred embodiment of the invention is described, without any limitative nature and with reference to the accompanying drawings in which:

Figure 1 is a schematic elevation view, partly in section, of the apparatus in which the intermediate arm is shown broken away to draw the attention to an irreal position of alignment thereof with the optical axis of the optical unit, which is impossible simultaneously with the alignment of the upper and lower arms.

Figure 2 is partial schematic view, on a larger scale, of the manual operating device.

The apparatus of the invention comprises a platform 1 and a column 2, a lower portion of which is supported in a fixed housing 3. The column may be actuated by a drive means comprising an electric motor 4, located above a support 5 and provided with a shaft 6 driving a drive pinion 7 which meshes with a ring gear situated externally of a rotary bushing 8, which is surrounded by the fixed housing 3.

The column 2 is fixedly attached to a generally radially outwardly extending guide pin 9 which passes through, in the first place, a helical slot (not shown) formed in the rotary bushing and, in the second place, a generally inverted L-shaped slot 10. When the guide pin 9 is in the vertical leg of the L-shaped slot 10, rotation of the bushing 8 causes a vertical movement of the column and when the guide pin 9 is in the generally horizontal leg of the L, the same rotation of the bushing 8 causes the column 2 to rotate.

The shaft 6 is provided with a cam 11 engaging an optical switch 12 stopping the motor 4.

A surrounding member 13 is supported on the fixed housing 3 and the upper portion thereof surrounds the column 2 and is extended to form the upper arm 13a which carried the video camera 14. The lower portion of the surrounding member 13 also surrounds the column 2 and supports a lower arm 16 in which there is mounted a semitransparent screen 15 situated vertically below the camera 14, with the distance therebetween being constant. The screen 15 is preferably provided with a mark corresponding with the centre thereof and a further mark showing an axis.

Between the said arms there is an intermediate arm 17 which, as stated above, is angularly offset from the other two arms.

The intermediate arm 17 carries a ball joint 18 for receiving a member 19, provided with adhesive means, to be referred to hereinafter. The said arm 17 is provided with a notch for a positioner 21 sliding in an elongate orifice 22 of the surrounding member 13.

On the platform 1 there is situated an optical unit constituted by a support 23, on which there is held, by means of a protective disc 24 and supports 25, an ophthalmic lens 26 to be centered and blocked. The optical unit comprises at least one condensing lens 27 and, at a lower level, a lamp 28, mounted on a bracket 29 and associated with a power control 30.

The platform 1 also carries a device comprising a manual control 31 which, by way of a cam 32, actuates a rightangled lever 35 which rocks about the apex thereof. As it rocks, the lever 35 engages the stem 36 whereby the surrounding member 13 is axially moved.

The apparatus works as follows: initially a member 19 is mounted on the ball joint 18 of the inter mediate arm 17. Furthermore, the ophthalmic lens 26 to be centered and blocked is mounted on the support means 25. The centre and axis marks of the screen 15 allow for appropriate mounting of the lens 26.

The light-emitting source 28 is illuminated, whereby the condensing lenses 27 produce an image of the ophthalmic lens 26. By appropriately moving the screen 15, this picks up the image, which is picked up by the video camera 14. It should be noted that the video camera 14 picks up the plane image produced on the screen 15, whereby any error due to the direct viewing of the lens 26, the thickness of which may cause distorsion, is avoided. The image picked up by the camera 14 is transmitted to a not shown monitor which at the same time picks up the image of the frame ring to which the lens 26 is to be mounted, the latter image having been suitably moved depending on the required corrections, in the light of the wearer's and the frame's data. The superimpositioning of both images allows it to be checked whether the lens 26 is suitable for the chosen frame,

Once this check has been made, the drive device causes angular movement of the upper and lower arms 13a and 16, respectively, and at the same time an equal angular movement of the intermediate arm 17, whereby the ball joint 18 and the member 19 are aligned with the optical axis of the optical unit. Lowering of the column 2 causes a lowering of the intermediate arm 17, until the member 19 is adhered to the ophthalmic lens 26, precisely on the geometric and optical centre thereof.

Operation is initiated with the actuation of a microswitch 33 and is controlled by an electronic card 34, which also causes reverse movement of the arms 13a, 16 and 17, leaving the machine ready for receiving a new ophthalmic lens.

It is noted that the lens 26 receives the blocking member 19 on the centre thereof, whereby during the subsequent bevelling process, the ophthalmic lens rotates in a fully satisfactory way.

Claims

1.- An apparatus for centering and blocking ophthalmic lenses for use in lens bevelling machines, said apparatus being provided with: support means (25) for the ophthalmic lens (26); means (17) for adhering a member (19) to said ophthalmic lens (26); a monitor receiving a digital image of the contour of the shape to be obtained by bevelling; and a video camera (14) which is located vertically above the said ophthalmic lens (26), picks up images and transmits them to said monitor, characterised in that it comprises: a) an optical unit (27, 28) having at least one condensing lens (27) and by a light-emitting source (28), said unit being situated at a lower level than said support means (25) and defining an optical axis; and b) an at least partially transparent screen (15), adapted to be located with the centre thereof aligned with said optical axis, inserted between said video camera (14) and said support means (25) and capable of receiving an image, projected by said optical unit (27, 28), of the ophthalmic lens (26) situated on said support means (25); and in that the distance between the video camera (14) and the transparent screen (15) is constant.

2.- The apparatus of claim 1, characterised in that said transparent screen (15) is moveable in the direction of said optical axis appropriately to receive the image of the ophthalmic lens (26) projected by the optical unit (27, 28).

3.- The apparatus of claim 1 or 2, characterised in that it is provided with a column (2) capable of rotation and axial movement and the column (2) is

associated at the top end thereof with a surrounding member (13) provided with an upper arm (13a) supporting the video camera (14) and a lower arm (16) carrying the transparent screen (15), said surrounding member (13) being vertically moveable independently of the column (2).

4.- The apparatus of claim 3, characterised in that the independent vertical movement of the surrounding member (13) is effected by a control (31) causing rotation of a cam (32), such that rotation of said cam (32) is adapted to actuate a microswitch (33) to initiate the operative cycle of the apparatus.

5.- The apparatus of claim 3, characterised in that the column (2) is provided with an intermediate arm (17) carrying a member (19) to be adhered to the ophthalmic lens, said arm (17) being angularly offset from said upper (13a) and lower (16) arms.

6.- The apparatus of any one of claims 3 to 5, characterised in that a lower portion of the column (2) is surrounded by a rotary bushing (8) provided with a helical slot and an external ring gear meshing with a drive pinion (7) driven by a motor (4), said rotary bushing (8) being in turn surrounded by a fixed housing (3) provided with an inverted L-shaped slot (10), there being a guide pin (9) fixedly attached to the column (2) which passes through said slots, such that rotation of the bushing (8) causes: a) a vertical movement of the column (2) while the guide pin (9) is in the helical slot and the vertical leg of the inverted L-shaped slot (10); and b) a rotation of the column (2) when the guide pin (9) is in the helical slot and the generally horizontal leg of the inverted L-shaped slot (10).

7.- The apparatus of claim 6, characterised in that the drive pinion (7) supports a cam (11) which engages an optical switch (12) which switches the motor (4) off.

FIG. 1

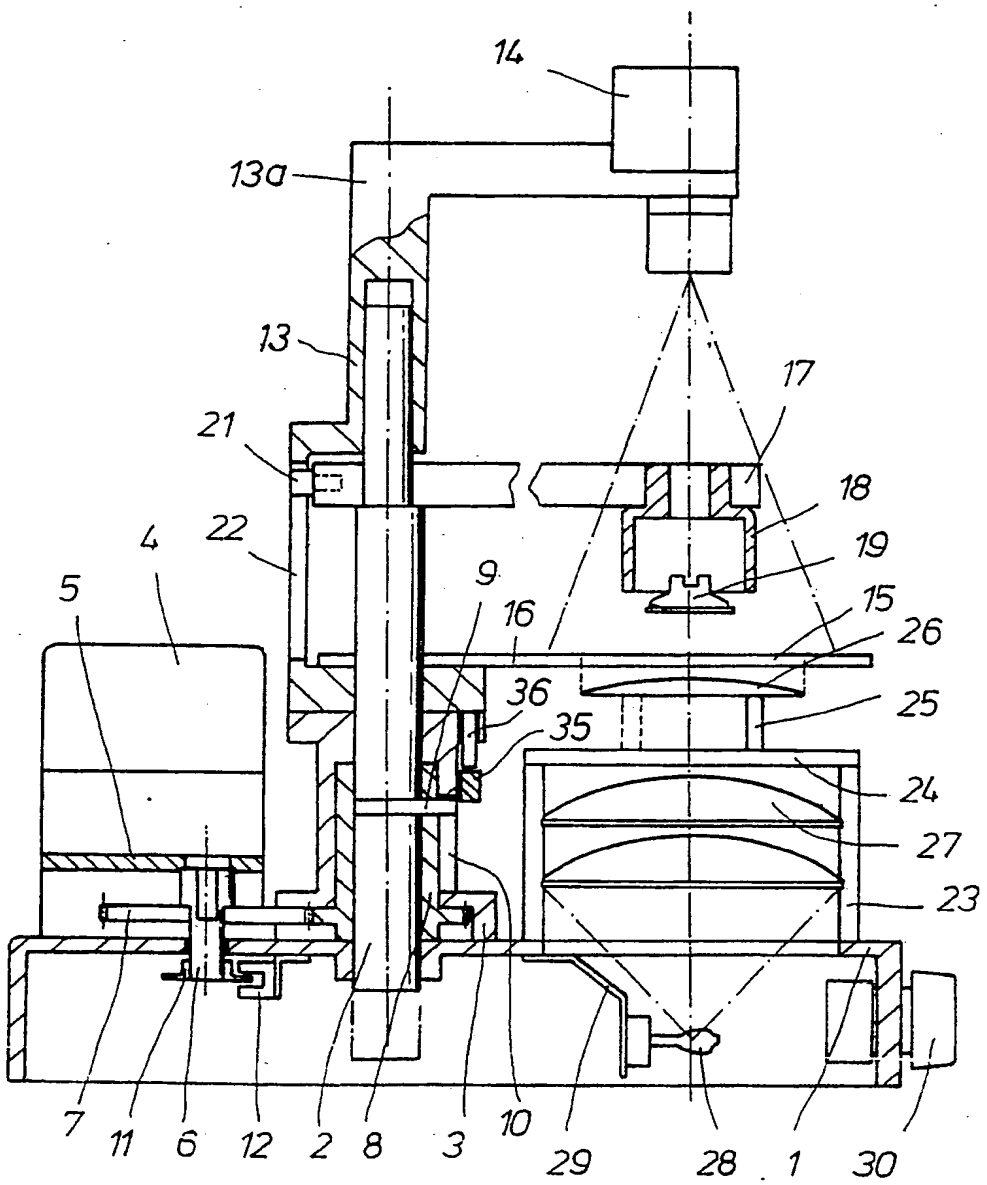
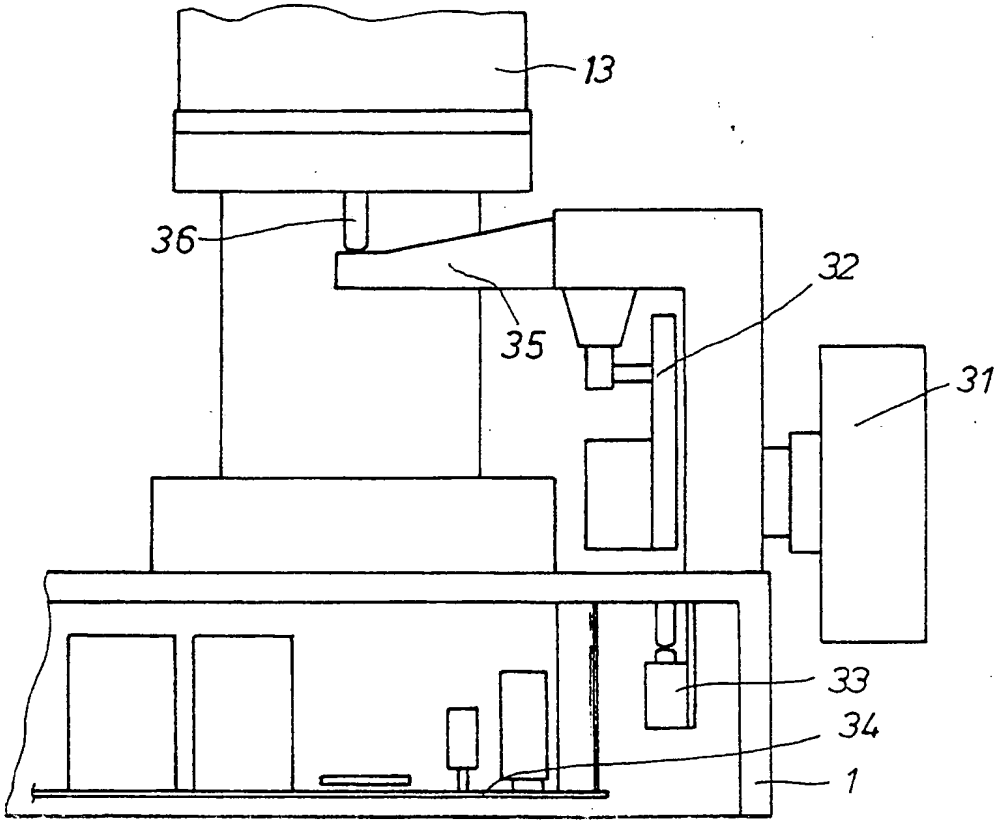


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number

EP 90500068.3

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US - A - 4 169 318 (CORTES) * Fig. 4,5 * --	1,3	B 24 B 9/14 G 02 C 7/02
A	DE - A1 - 2 713 168 (WERNICKE & CO.) * Page 14, lines 18-20 * --	1,3	
A	US - A - 3 828 842 (TAGNON) * Fig. 2 * --		
A	FR - A1 - 2 582 975 (BRIOT) * Fig. 4 * ----		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 23 Q
B 24 B
G 02 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	24-10-1990	GLAUNACH

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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